

STATEMENT OF BASIS

IRP SITE NO. LF-51 UPPER MEMORIAL LAKE LANDFILL

EGLIN AIR FORCE BASE, FLORIDA

OBJECTIVE

This Statement of Basis (SB) explains the proposed remedy for Installation Restoration Program (IRP) Site No. LF-51 Upper Memorial Lake Landfill located on Eglin Air Force Base (Eglin) Main Base, and managed by the Eglin IRP office. This site is designated in the U.S. Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) Hazardous and Solid Waste Amendments (HSWA) Permit for Eglin as Solid Waste Management Unit (SWMU) LF-51. The SB is intended to identify the proposed remedy for the landfill, to explain the rationale for the remedy selection, and to solicit public review, comment, and involvement in the remedy selection process.

A RCRA Facility Investigation (RFI)/Baseline Risk Assessment (BRA) and a Corrective Measures Study (CMS) have been completed at IRP Site No. LF-51. This environmental work is summarized below. The CMS Report (REI, March 1998) recommended Land Use Controls (LUCs) as part of the corrective measures activities. To implement the LUCs, a LUCs Implementation Plan (LUCIP) will be developed by the Air Force for this site. The LUCIP will be approved by the EPA and will also serve as the Corrective Measures Implementation Plan (CMIP), as required to implement a remedy, pursuant to RCRA.

INTRODUCTION

IRP Site No. LF-51 was previously identified as SWMU LF-51 in the Permit for Eglin, issued by EPA Region 4, effective September 16, 1986, and reissued April 26, 1998. This SWMU is regulated under the Permit, which requires that SWMUs be investigated, remediated, and closed. The Permit requires that an SB be prepared which identifies the proposed remedy for the landfill, explains the rationale for the remedy selection, and allows for a Public Comment Period of 45 days.

The public is invited to comment on this proposed remedy for IRP Site No. LF-51, or any other remedial alternatives, including those not previously studied. This SB includes information on how the public may participate in this decision-making process.

The EPA - Region 4 will finalize the remedy selection decision, by modifying the HSWA Permit to incorporate the corrective measure, subsequent to Florida Department of Environmental Protection (FDEP) review of, and concurrence with, this SB, and the public comment period has ended. All information submitted during this time frame will be reviewed and considered before final approval. Eglin has developed a Land Use Control Action Plan (LUCAP), as described in a memorandum distributed by EPA (U.S. EPA, 1998), which establishes the Agency's policy on LUCs at Federal Facilities. Eglin, EPA, and FDEP have entered into a memorandum of agreement (MOA)

which outlines the LUCs as described in the EPA Region 4 Memorandum, *Assuring LUCs at Federal Facilities*, dated April 21, 1998. This MOA can be found in Eglin Administrative Record. This MOA serves as Eglin's LUCAP. A LUCIP will be developed by the Air Force IRP and will serve as the Corrective Measures Implementation Plan (CMIP). The LUCIP will be implemented in accordance with EPA Policy.

This SB provides a summary of past investigation work performed at IRP Site No. LF-51, however, this SB should not be considered a substitute for the actual technical documents. A [glossary](#) of technical terms and a list of [acronyms](#) are included at the end of this report.

SITE DESCRIPTION AND BACKGROUND

As noted above, the environmental work at IRP Site No. LF-51 during the past three years has included an RFI/BRA and a CMS. A listing of the documents associated with this work are as follows:

- *Draft RCRA Facility Investigation Report (RFI) and Baseline Risk Assessment (BRA), Upper Memorial Lake, LF-51 (F4A)*, submitted January, 1996 (Parsons ES, 1996);
- *Draft Focused Corrective Measures Study, Upper Memorial Lake Landfill (LF-51)*, submitted in July, 1996 (REI, 1996);
- *Focused Corrective Measures Study, Upper Memorial Lake Landfill (LF-51), Revision 1*, submitted in September, 1997 (REI, 1997), and;
- *Focused Corrective Measures Study, Upper Memorial Lake Landfill (LF-51), Revision 2*, submitted in March 1998 (REI, 1998).

These reports, and other documents related to IRP Site No. LF-51, can be found in the Eglin Administrative Record, which is available for public review. The location of this public record is presented in the Public Participation Section of this SB.

IRP Site No. LF-51 Upper Memorial Lake Landfill is located on Eglin Main Base adjacent to the northeast branch of the Upper Memorial Lake ([Figures 1 and 2](#)). [Figure 2](#) shows the extent of the site. IRP Site No. LF-51 is located in an industrial setting and is used infrequently by recreators and workers. The site is located approximately 0.25 miles south of the runways in a relatively remote area which is partially wooded and partially cleared and grassy ([Figure 2](#)). Upper Memorial Lake itself bounds the west side of the site. The site has no fence or other barriers restricting access. Boaters use the lake for fishing. Recreators also pass along the road on the east side of the site ([Figure 2](#)) during horseback riding activities. Eglin workers occasionally access the site. The Eglin Main Base residential area is located approximately 0.5 miles west of the site. The current land use at IRP Site No. LF-51 is nonresidential. It is designated as open space in Eglin's *Basewide Risk Assessment Guidance, Revision 1* (OBG, June 1998).

The site consists of an open grassy area and a wooded sloping grade leading down toward the lake. In the open grassy area, the ground surface is at an approximate elevation of 40 feet above the National Geodetic Vertical Datum (NGVD) and slopes gently toward the slope break. The slope to

the lake is well vegetated with groundcover, shrubs, and trees (e.g., chinaberry, laurel, cherry, juniper, and mimosa). It extends to the edge of the lake at an approximate 28% grade. The soils within the landfill material consist of dry, dark gray, poorly graded sand with silt. The water surface of the Upper Memorial Lake is at an elevation of approximately 12 feet NGVD. The groundwater elevation at the site is approximately 12 to 15 feet NGVD. The depths to groundwater range from 26 to 49 feet below land surface (bls).

Landfilling activities reportedly took place during an undetermined time period in the 1960s. Since this time the site has consisted of both open grassy and wooded areas with no physical access restrictions. In 1983, Eglin notified the U.S. EPA and the FDEP that an estimated 150 drums potentially containing herbicides may have been disposed of in the Upper Memorial Lake Landfill. At this time, the Air Force collected soil samples in the landfill area for 2,4-dichlorophenoxyacetic acid (2,4-D), 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), and 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). No concentrations were detected above the reporting limits of these constituents. In March 1992, the approximate location and the extent of the buried drums were identified on the basis of a surface geophysical survey using an EM-31 data acquisition system and test pit excavations. Soil samples collected from the test pits within the drum burial area indicated trace levels of 2,3,7,8-TCDD. None of the drums were removed during the test pit excavation activities. Photodocumentation showed the drums to be crushed. Although the drums reportedly had at one time contained herbicides (possibly Herbicide Orange and/or Herbicide Purple), they appeared to have been empty at the time of the disposal.

In 1993, Eglin collected sediment and fish tissue samples from the Upper Memorial Lake. Trace levels of 2,4,7,8-TCDD were detected in eight sediment samples and a maximum of 0.46 nanograms per kilogram (ng/Kg) of 2,3,7,8-TCDD was detected in fish flesh samples. However, the analytical results from supplemental samples collected during the Focused Corrective Measure Study (CMS; REI, March 1998), 2,3,7,8-TCDD is not confirmed to be present in site soils. The RFI (ES Parsons, January 1996) results indicated that TCDD was not detected in the sediment of Upper Memorial Lake adjacent to IRP Site No. LF-51. Therefore, the presence of 2,3,7,8-TCDD in the one fish tissue sample is not related to the site and should not be included in the sampling regimen. In addition, the Baseline Risk Assessment (BRA) concluded that the carcinogenic risks associated with ingestion of fish ($4E-06$) is within EPA's acceptable range (ES Parsons, January 1996).

RFI/BRA was performed at IRP Site No. LF-51 in 1995 (Parsons ES, 1996). One of the results of the RFI was the determination that the area of the site surrounding the drum burial area was used for hardfill disposal. Fragments of brick, asphalt, metal, wood, and other miscellaneous items were observed from exploratory borings. More hardfill material appeared to be present in the western part of the landfill and around the drum burial area than in the surrounding landfill.

To develop the corrective measures alternatives, a detailed review of the *Draft* RFI/BRA, was performed. Based on that review, the list of chemicals of concern (COCs) identified in the RFI/BRA were refined, remedial goal options (RGOs) were calculated, and select corrective measures

alternatives were evaluated and presented in the *Draft Focused CMS* (REI, 1996), in July, 1996. The document also identified some gaps which needed to be addressed before a conclusive recommendation of a corrective measure alternative could be presented. Therefore, additional data were obtained and evaluated prior to the submittal of the Focused CMS, Revision 1. This additional work included incorporating additional background analytical data available from a Site Investigation (SI) conducted at an Area of Concern (AOC) near IRP Site No. LF-51; utilizing Tier II Screening Levels (background) from the basewide database; collecting additional site-specific data (soil, groundwater and sediment samples); and utilizing these new data to reassess the potential risks associated with the site. These additional data and the results of the risk evaluation on the data set are presented below.

The corrective measures evaluation presented in the Focused CMS, Revision 1 (REI, 1998) includes detailed documentation of how the selected corrective measures will comply with each of the standards listed in the RCRA Corrective Action Plan (U.S. EPA, 1994). These standards are as follows:

1. Protect human health and the environment;
2. Attain media cleanup standards set by implementing agency;
3. Control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment;
4. Comply with any applicable standards for management of wastes; and
5. Other factors.

PROPOSED REMEDY

The recommended corrective measure alternative for the IRP Site No. LF-51 Upper Memorial Lake Landfill, as outlined in the Focused CMS, Revision 2 (REI, 1998), is Alternative 5, Erosion Control and Habitat Restoration with LUCs. This remedy will protect human health and the environment. The future use of the site is not expected to deviate substantially from its current land use. Should a change in current land use be required, it will be managed in accordance with the LUCAP and the LUCIP.

Alternative 5, Erosion Control and Habitat Restoration with LUCs involves 1) the installation of a nominal one-foot layer of topsoil on the flat portions of the site, 2) the installation of rip-rap gabions and other erosion control structures in the gullies and other steep parts of the slope, 3) the installation of native trees and shrubs on the sloped parts of the site, 4) the installation of native grasses and trees over the soil cover on the upland parts of the site, 5) scheduled inspections of the site and the surrounding area, 6) annual sampling and analysis of local sediments, 7) maintenance of the catch and release fishing policy at Upper Memorial Lake, and 8) implementation and enforcement of property LUCs. Current and future use of the property will be limited, and no residential or other development of the property will be allowed without the proper engineering controls. Depending on the location, nature, and intensity of potential future land use activities, the Air Force shall conduct additional site

investigation and assessment activities to determine the proper engineering controls if existing information is inadequate. In addition, because of the potential impacts to groundwater from the site, LUCs will be implemented within the boundaries of these sites to assure that the groundwater beneath the landfill is not used as a potable source. Should a change in current land use be required, it will be handled in accordance with the LUCAP MOA and the LUCIP.

NATURE OF CONTAMINANTS/SUMMARY OF RISKS

The environmental work at IRP Site No. LF-51 has included collecting samples of surface and subsurface soil, groundwater, and the sediment and surface water of Upper Memorial Lake. Several fish tissue samples were also collected and analyzed for 2,3,7,8-TCDD before the RFI. A risk evaluation was performed on these data to estimate the risks to human and ecological receptors posed by the constituents in these media. The potential human exposure groups used in the risk evaluation were worker, recreator, and future resident. The exposure pathways for all of these exposure groups with regard to sediment were incidental ingestion. The exposure pathway for these groups for fish was ingestion. For groundwater, the exposure to future residents via showering was evaluated. The exposure to current/future recreators and the future residents to surface soil via incidental ingestion and dermal contact was evaluated. Similarly, the exposure to future residents via incidental ingestion and dermal contact for subsurface soils was evaluated. For the ecological risk evaluation, several indicator species, including vegetation, invertebrates, beach mouse, short-tailed shrew, American robin, mallard, and the red-tailed hawk, were used as potential receptors. [Tables 1 and 2](#) summarize the potential exposure groups and the exposure pathways that were used during the risk evaluation.

The risk evaluation identified several human health COCs in the media evaluated. Prominent constituents included polynuclear aromatic hydrocarbons (PAHs; e.g., benzo(a)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene), some pesticides (e.g., dieldrin and DDT), and metals (arsenic and beryllium). The maximum concentrations of the identified human health COCs within each media are presented in [Table 3](#). The following are the maximum lifetime carcinogenic risks posed by these COCs for the different media at IRP Site No. LF-51:

- *Surface soil:* 7E - 5
- *Subsurface soil:* 6E - 5
- *Sediment:* 4E - 6
- *Surface Water:* No carcinogenic COCs identified
- *Fish tissue:* 5E - 3
- *Groundwater:* 3E - 5

Human health cancer risks considered acceptable by EPA for selecting remedies under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; Title 40 of the Code of Federal Regulations Part 300) fall within the range of 1E-6 (one in a million) to 1E-4 (one in 10,000). EPA uses a cumulative risk calculation in which all risk drivers (contaminants), all exposure

pathways, and all media (groundwater, soil, surface water, and sediment) are totaled for each exposure group. FDEP further looks at the lifetime cancer risk for each individual risk driver in a single medium. For protection of human health, the FDEP cleanup goal is to achieve a maximum excess lifetime cancer risk of $1\text{E-}6$, for each individual risk driver. In other words, a typical person exposed to a chemical carcinogen at the FDEP cleanup goal and at a specific frequency could expect an increment of one chance in a million increase, above their existing lifetime cancer risk. FDEP considers site-specific cleanup levels greater than $1\text{E-}6$ if technical unfeasibility, disproportionate costs, or other relevant factors justify their impracticability. These levels, however, must be based on the ability to achieve an equivalent risk management level of $1\text{E-}6$ through reliable LUCs or other effective means that manage the extent and frequency of exposure.

Currently, no exposure pathway exists to human health with regard to groundwater at the site. It should be noted that the calculated human health and ecological risks associated with groundwater are not considered a concern due to the extreme conservatism utilized to calculate the risk. The identified COCs in the groundwater and their associated risks were based on modeling results of contaminant transport performed during the RFI (ES Parsons, 1996). The modeling parameters represented greatly simplified natural conditions which caused the results to be extremely conservative. In addition, two of the constituents identified as COCs (trichloroethylene [TCE] and benzene) were never detected in any of the actual groundwater samples submitted for laboratory analyses. Rather, the model predicted that the constituents should be in the medium based on low concentrations detected in the soil. Since the landfill has been exposed to the elements for over 25 years and the low concentrations of these two contaminants have yet to impact the groundwater, it is unlikely that they ever will. The third COC identified in the groundwater (acetone) is a common laboratory artifact and is interpreted not to represent the actual groundwater quality (REI, 1998).

With regard to non-cancer risks, Hazard Quotients (HQs) were calculated for each individual constituent and then all of the HQs for the constituents in a particular medium were added together to represent the Hazard Index (HI). At IRP Site No. LF-51, none of the identified COCs posed a total HI greater than 1.0 for surface soil, subsurface soil, sediment, and surface water. The maximum HQs for fish tissue consumption and groundwater exposure were 5.59 and 18, respectively. The value for groundwater was based on the model described above. An HQ greater than 1.0 indicates that the exposure level exceeds the protective level for a particular constituent. If the HQs for individual constituents are less than one, but the sum of the HQs (i.e., the HI) for all substances in an exposure medium is greater than 1.0, then there may be a concern for potential health effects.

Ecological COCs were also determined, as summarized in [Table 3](#). Six ecological COCs (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, antimony, and barium) were identified for the surface soil, based on the potential hazard to representative ecological receptors. Risks from these constituents were indicated for the short-tailed shrew. Risks for the American robin were also indicated by DDD, DDE, DDT, and dieldrin. No risks were identified for vegetation, soil invertebrates, beach mouse, or the red-tailed hawk.

For sediment, six refined COCs were identified, based on the hazard to ecological receptors. Risks from organochlorine pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and dieldrin) were indicated for benthic organisms. There are also risks from metals (aluminum and vanadium) only to aquatic vegetation. No risks were identified for the mallard.

In surface water, the only COCs identified were for the heron (from ingestion of fish), bis(2-ethylhexyl)phthalate and diethylphthalate. Phthalates are common laboratory contaminants. No COCs were identified for direct exposure of aquatic organisms. For groundwater discharge to surface water, no COCs for piscivores or aquatic organisms were identified.

PROPOSED REMEDY IMPLEMENTATION

Alternative 5 involves placing a nominal one-foot layer of top-soil onto the cleared, flatter portions of the landfill that pose elevated risks to recreators and ecological receptors. This area would be restored with native grasses and trees to reduce erosion of the newly placed soil into the Upper Memorial Lake. Along the slope leading down to Upper Memorial Lake, existing pathways for soil erosion (drainage swales, gullies, animal trails) would be restored using engineered erosion control measures, including stone-filled gabions and bags of concrete laid perpendicular to the direction of overland run-off. Trees and shrubs would be planted along the slope to the Upper Memorial Lake. The risk posed by the fish consumption scenario will be mitigated by implementing a catch and release fishing program.

LUCs implemented under Alternative 5 are designed to discourage intrusive activities that could result in direct exposure to residual chemicals in site soils. The specific methods and protocols for establishing LUCs are presented in Eglin's *IRP Draft Land Use Controls Implementation Manual* (CH2MHILL, 2000). Environmental monitoring would also be conducted under Alternative 5 to evaluate the long term remedy effectiveness. LUCs and monitoring would include the following:

- Warning signs and catch and release signs,
- Scheduled quarterly inspections,
- Annual sediment monitoring will be conducted for a minimum of five years. The sediment quality data will be reviewed at least after five years to determine the need to extend the monitoring program longer, and
- LUCs.

This alternative would include posting two types of warning signs. One type identifies areas of the site that are not to be disturbed (for example, by excavation), and the other type informs the general public of the catch and release policy at the lake. Eglin will further instruct the public regarding the catch and release program at the time the required fishing licenses are purchased. This communication will occur via Eglin's *Outdoor Recreation, Hunting, and Freshwater Fishing Map and Regulations 1999-2000*, which is distributed to fishers at the time of purchasing an Eglin Fishing Permit. Section XIV.J of this document states the following: **"Catch and Release Areas.** Weekly Pond, Upper Memorial Lake, Hurlburt Lake, and Jack Lake, located on main base, will be

open to fishing on a “catch and release” basis only. All fish caught in these ponds must be immediately released.”

Scheduled inspections would be conducted by Eglin personnel knowledgeable of environmental conditions at the IRP Site No. LF-51 and of the potential risks posed by the site. The inspection frequency would be quarterly. The period of maintenance and inspection will be required for as long as the wastes remain in place.

Environmental monitoring will consist of collecting sediment samples from Upper Memorial Lake. This annual sampling and analysis (Semi-Volatile Organic Compounds [SVOCs], Pesticides, and Metals) of Upper Memorial Lake sediments at locations immediately adjacent to the IRP Site No. LF-51 would be conducted for five years to monitor environmental conditions. The pesticides included in these laboratory analyses will include the ecological COCs listed in the Nature of Contaminants/Summary of Risks section. Additional corrective measures may be required if the sediment quality deteriorates further during this five-year period.

Property LUCs offer long-term protection for current owners and potential developers of nearby properties against unauthorized use of the IRP Site No. LF-51 area. The LUCs would identify the IRP site as an area where disposal activities have occurred.

The LUCs will consist of the following:

- The site will be restricted from residential development without proper engineering controls. Depending on the location, nature, and intensity of potential future land use activities, the Air Force shall conduct additional site investigation and assessment activities to determine the proper engineering controls if existing information is not adequate.
- Fishing in Upper Memorial Lake will be restricted to catch and release. Public advisories stating such prohibitions will be posted around the lake.
- Future development will be restricted from using the shallow aquifer under this site as a source of potable drinking water.
- The property will be inspected quarterly to ensure that unauthorized use of the property does not occur and that the status of the property is unchanged. The inspection will also include signage maintenance. The Air Force will submit an annual site status report to both the EPA and FDEP, in accordance with the mutually approved LUCAP.
- The thickness of the soil cover will be evaluated every five years by performing shallow soils borings. The existing grades will be maintained. If erosion or subsidence occurs, up to 18 inches of cover will be placed in affected areas.
- The Air Force will notify EPA and FDEP immediately upon the discovery of any unauthorized change in land use.
- For requests for major land use changes, written requests will be submitted to both the EPA and FDEP, in accordance with the mutually approved LUCAP. Requests will be submitted as soon as a major land use change is anticipated, to allow sufficient time for regulatory review and

amendments to remedy selection decision documents. These requests for regulatory reviews will be made no less than 90 days before the anticipated land use change. Major land use changes include any change in land use (for example, from industrial or recreational to residential) that would be inconsistent with those specific exposure assumptions in the human health and/or ecological risk assessments that served as the basis for the LUCs; any site activity that may disrupt the effectiveness of the implemented LUC (for example, excavation at a landfill); groundwater pumping that may impact a groundwater pump and treat system; a construction project that may impact ecological habitat protected by the remedy; removal of a fence; unlocking of a gate; or removal of warning signs; or any site activity intended to alter or negate the need for the specific LUC(s) implemented at the site.

A LUCIP will be developed to document the implementation of these LUCs. In addition, the LUCIP will designate an Eglin Environmental Management Restoration (EMR) representative to be responsible for compliance with the LUCs, and the LUCIP will be referenced in appropriate Eglin basewide planning documents. Further, if land use changes are required, the LUCIP and the LUCAP will address how the LUCs or remedy will be changed, if necessary.

By separate MOA dated December 23, 1999, with EPA and FDEP, Eglin on behalf of the Department of the Air Force, agreed to implement base-wide, certain periodic site inspection, condition certification and agency notification procedures designed to ensure the maintenance by Installation personnel of any site-specific LUCs deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the Air Force's substantial good-faith compliance with the procedures called for therein, reasonable assurances would be provided to EPA and FDEP as to the permanency of those remedies which included the use of specific LUCs.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by the Air Force, EPA and FDEP that the contemplated permanence of the remedy reflected herein shall be dependant upon the Installation's substantial good-faith compliance with the specific LUC maintenance commitments reflected therein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred on may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection on human health and the environment.

SUMMARY OF ALTERNATIVES

Based on the environmental work performed at IRP Site No. LF-51 and taking into account the COCs and the medium in which they were identified, five corrective measures alternatives were developed and evaluated to provide a broad range of corrective measure responses to address IRP Site No. LF-51 soils (REI, 1998). These alternatives include the following:

- Alternative 1 - LUCs
 - Alternative 1A - With Fencing. Alternative 1A involves the construction of a fence around the perimeter of the site, scheduled inspections of the site and surrounding area, periodic sampling and analysis of local sediments, and the implementation and enforcement of property LUCs.
 - Alternative 1B - With Biotic Barrier, Rip-Rap, Fencing, and Monitoring. Alternative 1B involves 1) the construction of a biotic barrier and placement of rip-rap over the contaminated materials in IRP Site No. LF-51, 2) the construction of a fence around the site, 3) scheduled inspections of the site and the surrounding area, 4) periodic sampling and analysis of local sediments in Upper Memorial Lake, and 5) the implementation and enforcement of property LUCs.
- Alternative 2 - Capping - Alternative 2 involves the construction of an engineered synthetic cap over the impacted soils and implementation of LUCs with fencing.
- Alternative 3 - Limited Removal and Off-site Treatment/Disposal - Alternative 3 involves the excavation and subsequent backfilling of the upper four feet (approximately 4,200 cubic yards) of impacted soils at the site. Excavated soils would be disposed in a Subtitle C landfill facility. The excavation would be backfilled using clean soils from an off-site borrow source.
- Alternative 4 - Complete Removal and Off-site Treatment/Disposal - Alternative 4 involves the excavation and subsequent backfilling of all of the impacted soil (approximately 9,800 cubic yards) at the site. Excavated soils would be disposed at a Subtitle C landfill. The excavation would be backfilled using clean soils from an off-site borrow source.
- Alternative 5 - Erosion Control and Habitat Restoration with LUCs - Alternative 5 involves 1) the installation of a nominal one-foot layer of topsoil on the flat portions of the site, 2) the installation of rip-rap gabions and other erosion control structures in the gullies and other steep parts of the slope, 3) the installation of native trees and shrubs on the sloped parts of the site, 4) the installation of native grasses and trees over the soil cover on the upland parts of the site, 5) scheduled inspections of the site and the surrounding area, 6) periodic sampling and analysis of local sediments, 7) maintenance of catch and release fishing policy at Upper Memorial Lake, and 8) implementation and enforcement of property LUCs.

It should be noted that the corrective measure alternatives mentioned above specifically address site soils. Corrective measures were not warranted for groundwater at IRP Site LF-51 (Eglin, 1998). The corrective measure alternatives developed for the site also address monitoring and protecting

Upper Memorial Lake sediments from the potential impact of contaminated soils via overland erosion and deposition.

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

The recommended corrective action alternative for the IRP Site No. LF-51 Upper Memorial Lake Landfill is Alternative 5, Erosion Control and Habitat Restoration with LUCs. The recommendation is based upon an evaluation of Alternatives 1A, 1B, 2, 3, 4, and 5 against the criteria of 1) technical feasibility, 2) protectiveness of human health, 3) protectiveness of the environment, 4) institutional requirements, and 5) costs, as well as discussions about the site among the members of the Eglin Tier I Partnering Team (Eglin, January 1998). The Eglin Tier I Partnering Team is comprised of Eglin Project Managers, EPA and FDEP representatives, and environmental contractors who work at the base.

The rationale for recommending Alternative 5 as corrective measure for IRP Site No. LF-51 is presented below:

- 1) Alternative 5 is technically feasible.
- 2) Alternative 5 is protective of human health by eliminating soil, groundwater, and fish ingestion exposure pathways to humans under the hypothetical future residential land use scenarios. This is accomplished by incorporating LUCs to prevent future residential use and installing warning signs to discourage recreational use. Alternative 5 also would not involve any off-site transport of impacted soils and landfill wastes, which would potentially increase the risks and safety hazards to the surrounding public during its transport.
- 3) Alternative 5 is protective of the environment by inhibiting exposure to current ecological receptors in the upland parts of the site due to the installation of the one-foot soil cover. Furthermore, Alternative 5 would improve the overall quality and habitat of the site by the addition of trees and shrubs to inhibit erosion.
- 4) Although all of the corrective action alternatives would comply with all applicable Federal, State and local regulations, advisories and/or ordinances, Alternative 5 was agreed to by FDEP and EPA during the Eglin Tier I Partnering Meeting in January 1998 and is therefore considered agreeable to these agencies (Eglin, 1998).
- 5) Alternative 5 is as effective or more effective than Alternative 1A (LUCs with Fencing and Monitoring), for protection of human health and the environment. It is also more effective to maintain.

A discussion of the remaining corrective measures alternatives (Alternative 1A, 1B, 2, 3, and 4) against these five criteria is provided in REI (March 1998).

PUBLIC PARTICIPATION

The public is encouraged to provide comments regarding the corrective action alternatives provided in this Statement of Basis, or any other remedial alternatives, including those not previously studied. The public can review information on the IRP at Eglin and the investigations and actions taken under the Permit, including all reports and documents. The information repository and administrative record files are available at the following locations:

Eglin Air Force Base AAC/EMR 207
Second Street, Building No. 216
Eglin AFB, Florida 32542-5133

Technical Library
203 West Eglin Blvd., Suite 300
Eglin AFB, Florida 32542-5429

FDEP
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400.

A 45-day public comment period will be held from September 1, 2000 to October 15, 2000.

Comments received will be summarized and responses will be provided in the upcoming Responses to Comments document. The Responses to Comments document will be prepared following the close of the public comment period. The Responses to Comments will be included with the final permit modification. If requested during the Public Comment Period, EPA will hold a public meeting to respond to any oral comments or questions regarding this action. The public will be notified of the date, time, and place of any public hearing as soon as it is scheduled.

To request a hearing or provide comments for IRP Site No. LF-51, contact the following person in writing postmarked by October 15, 2000:

U.S. Environmental Protection Agency--Region IV
Federal Facilities Branch
61 Forsyth Street
Atlanta, Georgia 30303
Attention: Mr. Jon Johnston, Chief Federal Facilities Branch

To request further information, please contact any one of the following people:

Mr. Robert H. Pope
U.S. Environmental Protection Agency, Region IV
Federal Facilities Branch
61 Forsyth Street
Atlanta, GA 30303
(404) 562-8506

Mr. Greg Brown, P.E.
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(850) 921-6779

Mr. Howard Mathews
Eglin Environmental Management Restoration
207 N. 2nd Street
Building 216
Eglin AFB, FL 32542
(850) 882-7791

IMPORTANT DATES TO REMEMBER:

Public Comment period begins September 1, 2000.

Public Comment period ends October 15, 2000.

REFERENCES

- CH2M HILL, *IRP Draft Land Use Controls Implementation Manual, U.S. AAC and EMC*, Eglin Air Force Base, Florida, April 2000.
- Eglin Air Force Base, Eglin Tier I Partnering Meeting Minutes, January 1998.
- Parsons Engineering Science, Inc., *Draft RCRA Facility Investigation Report (RFI), Upper Memorial Lake, LF-51(F4A)* Eglin Air Force Base, FL, 1996.
- REI, *Draft Focused Corrective Measures Study, Upper Memorial Lake Landfill (LF-51)*, Eglin Air Force Base, FL, July 1996.
- REI, *Focused Corrective Measures Study, Upper Memorial Lake Landfill (LF-51), Revision 1*, Eglin Air Force Base, FL, September 1997.
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- U.S. Environmental Protection Agency, *RCRA Corrective Action Plan*, EPA 520-R-94-004, OSWER Directive 9902.3-2A, May 1994.
- U.S. Environmental Protection Agency, Memorandum to Federal Facilities Branch, *Subject: Assuring Land Use Controls at Federal Facilities*, 1998.

Table 1
Summary of Potential Human Health Exposure Groups and Pathways
IRP Site No. LF-51 Upper Memorial Lake Landfill
Eglin AFB, Florida

Media	Exposure Pathway	Exposure Groups				
		Recreator Adults	Recreator Children	Future Residential Adults	Future Residential Children	Worker
Surface Soil	Ingestion	X		X	X	
	Dermal contact	X		X	X	
Subsurface Soil	Ingestion			X	X	
	Dermal Contact			X	X	
Groundwater	Ingestion			X	X	
	Inhalation (Showering)			X	X	
	Dermal Contact			X	X	
Surface Water	Ingestion	X	X	X	X	
	Dermal Contact	X	X	X	X	
Sediment	Ingestion	X	X	X	X	X
Fish Tissue	Ingestion	X	X	X	X	

Table 2
Summary of Ecological Exposure Pathways and
Assessment Endpoints
IRP Site No. LF-51 Upper Memorial Lake Landfill
Eglin AFB, Florida

Media	Endpoints									
	Benthic Organism	Vegetation	Mallard	Soil Invertebrate	Beach Mouse	Short-tailed Shrew	American Robin	Red-tailed Hawk	Aquatic Organisms	Great Blue Heron
Surface Soil		X		X	X	X	X	X		
Groundwater (Discharge to Surface Water)									X	X
Surface Water									X	X
Sediment	X	X	X							

Table 3
Maximum Detected Concentrations of Chemicals of Concern
IRP Site No. LF-51 Upper Memorial Lake Landfill
Eglin Air Force Base, Florida

Media	Chemical	Receptor	Maximum Concentration	Comparative Level	
				Level	Source
surface soil (mg/Kg)	Antimony	ecological	1.8 J	3.1	Res. RBC(N)
	Barium	ecological	22.2	550	Res. RBC(N)
	benzo(a)anthracene	human	4.9	0.88	Res. RBC(C)
	benzo(a)pyrene	human	5.4	0.1	Res. FSCG
	benzo(b)fluoranthene	human	6.9	0.88	Res. RBC(C)
	DDD	ecological	0.067 J	2.7	Res. RBC(C)
	DDE	ecological	0.64	1.9	Res. RBC(C)
	DDT	ecological	1.8	1.9	Res. RBC(C)
	Dieldrin	human/ecological	0.21 J	0.04	Res. RBC(C)
	indeno(1,2,3-c,d)pyrene	human	2.2	0.88	Res. RBC(C)
subsurface soil (mg/Kg)	Dieldrin	human	55 J	0.04	Res. RBC(C)
	DDT	human	4.5	1.9	Res. RBC(C)
	benzo(a)anthracene	human	9.1	0.88	Res. RBC(C)
	benzo(a)pyrene	human	9.1	0.1	Res. FSCG
	benzo(b)fluoranthene	human	12	0.88	Res. RBC(C)
	indeno(1,2,3-c,d)pyrene	human	5.1	0.88	Res. RBC(C)
sediment (mg/Kg)	aluminum	ecological	25,000	20	RL
	arsenic	human	6.6 J	7.24	TEL
	benzo(a)pyrene	human	0.75 J	0.1	MDL
	beryllium	human	0.29 J	0.5	RL
	DDD	ecological	1.2	0.0013	MDL
	DDE	ecological	0.45	0.00207	TEL
	DDT	ecological	0.78	0.00119	TEL
	dieldrin	human/ecological	0.22	0.0008	MDL
	vanadium	ecological	37	5	RL
surface water (µg/L)	bis(2-ethylhexyl)phthalate	ecological	22	5.9	Human Health
	diethylphthalate	ecological	1.5 J	120,000	Human Health
fish tissue (ng/Kg)	2,3,7,8-TCDD	human	0.46	NA	NA
groundwater (µg/L)	acetone	human	1.3	700	FL Guidance
	benzene	human	ND	1	FL Primary MCL
	trichloroethylene	human	ND	3	FL Primary MCL

Res. RBC = U.S. EPA Region III Residential Risk-Based Criteria
Res. FSCG = Residential Florida Soil Cleanup Goal
FL Primary MCL = Florida Primary Maximum Contaminant Level
TEL = Threshold Effect Level
J = Laboratory estimated concentration
mg/Kg = milligrams per kilogram
µg/L = micrograms per liter

MDL = Method Detection Limit
RL = Reporting Limit
ND = Not detected
NA = None available
ng/Kg = nanograms per kilogram
C = Carcinogen
N = Non-carcinogen

ACRONYMS

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
AOC	Area of Concern
BRA	Baseline Risk Assessment
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMIP	Corrective Measures Implementation Plan
CMS	Corrective Measures Study
COC	chemical of concern
DoD	Department of Defense
EPA	Environmental Protection Agency
Eglin	Eglin Air Force Base
FDEP	Florida Department of Environmental Protection
FSCG	Florida Soil Cleanup Goal
HI	Hazard Index
HQ	Hazard Quotient
HSWA	Hazardous and Solid Waste Amendments
ICM	Interim Corrective Measures
IRP	Installation Restoration Program
LUC	Land Use Control
LUCAP	Land Use Control Action Plan
LUCIP	Land Use Controls Implementation Plan
mg/Kg	milligrams per kilogram (parts per million)
MCL	Maximum Contaminant Level
MOA	Memorandum of Agreement
NCP	National Contingency Plan
NFA	No Further Action
ng/Kg	nanograms per kilogram
NGVD	National Geodetic Vertical Datum
NTU	Nephelometric Turbidity Unit
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbons
PCBs	Polychlorinated Biphenyls
POI	Point of Interest
RBC	Risk-based Concentration
RCRA	Resource Conservation and Recovery Act
REI	Rust Environment & Infrastructure, Inc.
RFI	RCRA Facility Investigation
RGO	remedial goal option

ACRONYMS (CONTINUED)

SB	Statement of Basis
SI	Site Investigation
SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCE	trichloroethylene
TCL	Target Compound List
VOC	Volatile Organic Compound

GLOSSARY

Aquifer: Subsurface rock or sediment in a formation that is saturated and sufficiently permeable to yield economic quantities of water to wells and springs.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Delegates authority for the President to take response actions to limit dangers resulting from the release of hazardous substances, Response actions must be performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan developed by the EPA. CERCLA was substantially amended in 1986 under the Superfund Amendments and Reauthorization Act. The statute imposes far-reaching liability for costs of cleanup on waste generators, transporters, and current and past owners of disposal sites.

Contaminants of Potential Concern (COPC): contaminants that represent an actual or potential threat to human health or the environment.

Corrective Measures Study (CMS): Study to develop and evaluate possible corrective measures.

Facility: Refers to a military base or other entire federal installation, whereas the term site refers to a particular area (such as an operable unit) making up only a portion of the facility.

Environmental Protection Agency (EPA): EPA is the federal agency responsible for implementing environmental laws enacted by Congress. State EPA offices or their counterparts implement state or federal environmental laws.

Groundwater: Subsurface water trapped in or moving through fractures, cracks, cavities, and pore spaces under the ground. Units that yield appreciable amounts of water to wells are aquifers; intervening units of low permeability are aquitards or confining units. The top of the zone of complete saturation is called the water table.

Hazard Quotient (HQ): The ratio of a single substance exposure level over a specific time period to a reference dose for that substance derived from a similar exposure period.

Hazardous and Solid Waste Amendments (HSWA): Amendments to RCRA, passed in 1984, which greatly expand the nature and complexity of activities covered under RCRA. They include the Federal Underground Storage Program.

Human Health Risk Assessment (HHRA): Study to determine the likelihood that a given exposure or series of exposures may have damaged or will damage the health of individuals.

Installation Restoration Program (IRP): The Air Force program designed to identify, investigate, and cleanup contamination associated with past Air Force activities at active AF installations; government-owned, contractor-operated facilities, off-site locations where contamination may have migrated; third party sites; and sites that the AF formerly owned or used.

Land Use Control Action Plan (LUCAP): A memorandum of Agreement (MOA) among Elgin, EPA, and FDEP designed to assure the effectiveness and reliability of the required Land Use Controls (LUCs) for as long as any LUC continues to be required in order for the remedial/corrective action to remain protective.

GLOSSARY (Continued)

Land Use Control (LUC): Is broadly interpreted to mean any restriction or control, arising from the need to protect human health and the environment, that limits use of and/or exposure to any portion of that property, including water resources. This term encompasses institutional controls, such as those involving real estate interests, governmental permitting, zoning, public advisories, deed notices, and other legal restrictions. The term may also include restrictions on access, whether achieved by means of engineered barriers such as a fence or concrete pad, or by human means, such as the presence of security guards. Additionally, the term may involve both affirmative measures to achieve the desired restriction (e.g., night lighting of an area) and prohibitive directives (no drilling of drinking water wells). Considered altogether, the LUCs for a facility, in conjunction with the base master plan, will provide a blueprint for how its property should be used in order to maintain the level of protectiveness which one or more remedial/corrective actions were designed to achieve.

LUC Implementation Plan (LUCIP): A written plan, normally developed after a decision document has required one or more LUCs, for some particular area (operable unit, contaminated unit, and/or solid waste management unit). The LUCIP 1) identifies each LUC objective for that area (e.g., to restrict public access to the area for recreational use) and 2) specifies those actions required to achieve each identified objective (e.g., install/maintain a fence, post warning signs, record notice in deed records). LUCIPs specify what must be done to impose and maintain the required LUCs, and are therefore analogous to design and/or operation and maintenance plans developed for active remedies.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The NCP establishes procedures and standards for responding to releases of hazardous substances, pollutants and contaminants.

Permit: A RCRA permit, issued for Eglin, establishes the facility's operating conditions for managing hazardous waste.

Potable Water: Water that is safe for drinking and cooking.

RCRA Facility Investigation (RFI): Evaluates the nature and extent of the releases of hazardous waste.

Reasonable Maximum Exposure (RME): The maximum exposure reasonably expected to occur in a population.

Resource Conservation and Recovery Act (RCRA) of 1976: Requires each hazardous waste treatment, storage, and disposal facility to manage hazardous waste in accordance with a permit issued by the EPA or a state agency that has a hazardous waste program approved by the EPA.

Site Investigation (SI): Physical inspection of a potential IRP site that may include limited soil and water sampling. Used to confirm results of PA or support of a site that does not present an environmental hazard.

Solid Waste Management Unit (SWMU): Any discernable unit (to include regulated units) at which RCRA solid waste have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste.

GLOSSARY (Continued)

Statement of Basis (SB): The RCRA decision document that specifies the site remedy and establishes LUCs.

U.S. Environmental Protection Agency (EPA): The federal agency responsible for implementing environmental laws enacted by Congress.

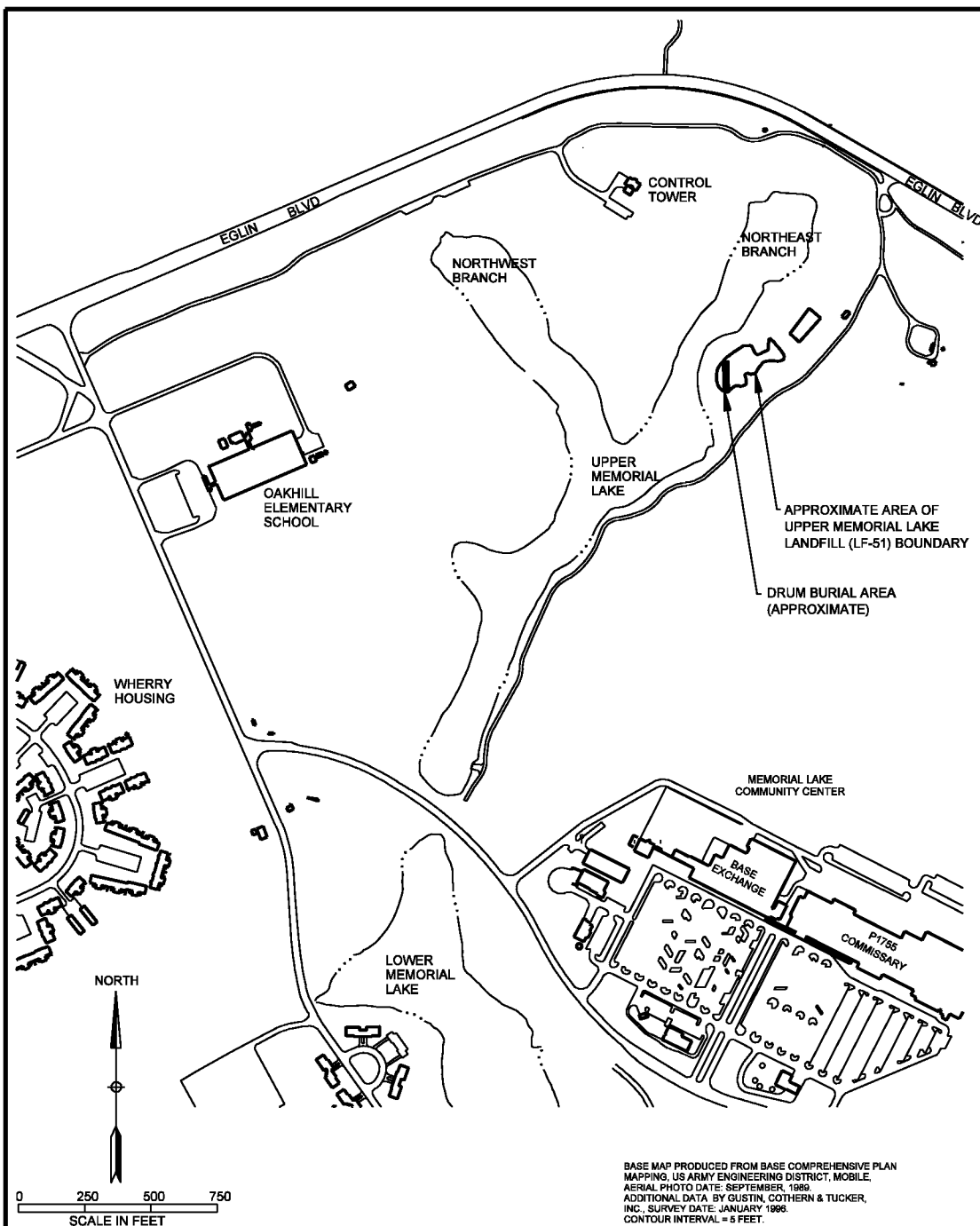


FIGURE 2
UPPER MEMORIAL LAKE LANDFILL
SITE LOCATION MAP-DETAIL

EGLIN AIR FORCE BASE, FLORIDA
 PROJECT NO. 55552.000